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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/997,244	11/30/2001	Satoshi Mashima	900-409	3534

23117 7590 08/18/2003

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EXAMINER
ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
1763	14

DATE MAILED: 08/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/997,244	Applicant(s) MASHIMA ET AL.
	Examiner Luz L. Alejandro	Art Unit 1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☑ Claim(s) *1,6 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6,8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the first pair of electrodes" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "the second pair of electrodes" in lines 7-8. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 recites the limitation "the first and second high frequency voltages" in lines 8-9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moustakas et al., U.S. Patent 4,407,710 in view of Shinichi, JP 07-183227 and further in view of Tomita et al., U.S. Patent 5,618,758.

Moustakas et al. shows the invention substantially as claimed including a solar cell production method comprising the steps of: forming a first electrode layer 11 on a substrate 10; forming a n-layer 12, an intrinsic layer 14 by glow discharge, and a p-layer 14, where the p and n layer can be reversed (see col. 2-line 66 to col. 4-line 32, col. 4-line 68 to col. 5-line 4 and fig. 1), and forming a second electrode layer 18 on the n-layer (see col. 4-lines 46-48).

Moustakas et al. fails to expressly disclose wherein in order to form the layers comprising amorphous silicon, applying first and second high frequency voltages between the first pair of electrodes and between the second pair of electrodes, respectively, to cause plasma discharge, the first and second high frequency voltages being modulated in accordance with first and second pulse waves, respectively, wherein ON periods of the first and second pulse waves are controlled so as not to overlap or coincide with each other, and wherein ON periods of the first and second pulse waves

are shorter than corresponding OFF periods, and the intrinsic layer is formed by a plasma CVD method employing plasma discharge caused by application of a pulse-modulated high frequency voltage having a pulse ON time of not longer than 10 microseconds and a duty ratio of not higher than 20%.

Shinichi discloses forming a layer by plasma CVD by applying first and second high frequency voltages between the first pair of electrodes (2A, 2B) and between the second pair of electrodes (3A, 3B), respectively, to cause plasma discharge, the first and second high frequency voltages being modulated in accordance with first and second pulse waves, respectively, wherein ON periods of the first and second pulse waves are controlled so as not to overlap or coincide with each other, and wherein ON periods of the first and second pulse waves are shorter than corresponding OFF periods (see abstract, figs. 1-6, and paragraph 0018 which discloses the duty ratio to be 10-50 percent). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Moustakas et al. so as to perform the plasma process disclosed by Shinichi because in this way a film having a uniform thickness and quality can be formed on a substrate.

Neither Moustakas et al. or Shinichi disclose a pulse ON time of less than 10 microseconds. Tomita et al. discloses a method of forming an amorphous silicon film using pulsed plasma CVD wherein the pulse length is 50 microseconds or less and the duty ratio is 5% or less (col. 2, lines 61-65 and col. 3, lines 21-35). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the intrinsic silicon of Moustakas et al. modified by Shinichi

using the process disclosed by Tomita et al. because an excellent photoconductivity and an excellent photoconductivity/dark conductivity ratio can be obtained since the content ratio of Si-H_2 bonds to Si-H bonds is reduced.

Claims 1, 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moustakas et al., U.S. Patent 4,407,710 in view of in view of Shinichi, JP 07-183227 and further in view of Noriyuki et al., JP 2000-223424 (machine translation).

Moustakas et al. shows the invention substantially as claimed including a solar cell production method comprising the steps of: forming a first electrode layer 11 on a substrate 10; forming a n-layer 12, an intrinsic layer 14 by glow discharge, and a p-layer 14, where the p and n layer can be reversed (see col. 2-line 66 to col. 4-line 32, col. 4-line 68 to col. 5-line 4 and fig. 1), and forming a second electrode layer 18 on the n-layer (see col. 4-lines 46-48).

Moustakas et al. fails to expressly disclose wherein in order to form the layers comprising amorphous silicon, applying first and second high frequency voltages between the first pair of electrodes and between the second pair of electrodes, respectively, to cause plasma discharge, the first and second high frequency voltages being modulated in accordance with first and second pulse waves, respectively, wherein ON periods of the first and second pulse waves are controlled so as not to overlap or coincide with each other, and wherein ON periods of the first and second pulse waves are shorter than corresponding OFF periods, and the intrinsic layer is formed by a plasma CVD method employing plasma discharge caused by application of a pulse-

modulated high frequency voltage having a pulse ON time of not longer than 10 microseconds and a duty ratio of not higher than 20%.

Shinichi discloses forming a layer by plasma CVD by applying first and second high frequency voltages between the first pair of electrodes (2A, 2B) and between the second pair of electrodes (3A, 3B), respectively, to cause plasma discharge, the first and second high frequency voltages being modulated in accordance with first and second pulse waves, respectively, wherein ON periods of the first and second pulse waves are controlled so as not to overlap or coincide with each other, and wherein ON periods of the first and second pulse waves are shorter than corresponding OFF periods (see abstract, figs. 1-6, and paragraph 0018 which discloses the duty ratio to be 10-50 percent). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Moustakas et al. so as to perform the plasma process disclosed by Shinichi because in this way a film having a uniform thickness and quality can be formed on a substrate.

Neither Moustakas et al. or Shinichi disclose a pulse ON time of less than 10 microseconds. Tomita et al. discloses a method of forming an amorphous silicon film using pulsed plasma CVD wherein the pulse length is 50 microseconds or less and the duty ratio is 5% or less (col. 2, lines 61-65 and col. 3, lines 21-35). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the intrinsic silicon of Moustakas et al. modified by Shinichi using the process disclosed by Tomita et al. because an excellent photoconductivity

and an excellent photoconductivity/dark conductivity ratio can be obtained since the content ratio of Si-H_2 bonds to Si-H bonds is reduced.

Response to Arguments

Applicant's arguments with respect to claims 1, 6, and 8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 703-305-

4545. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Luz L. Alejandro
Primary Examiner
Art Unit 1763

August 14, 2003